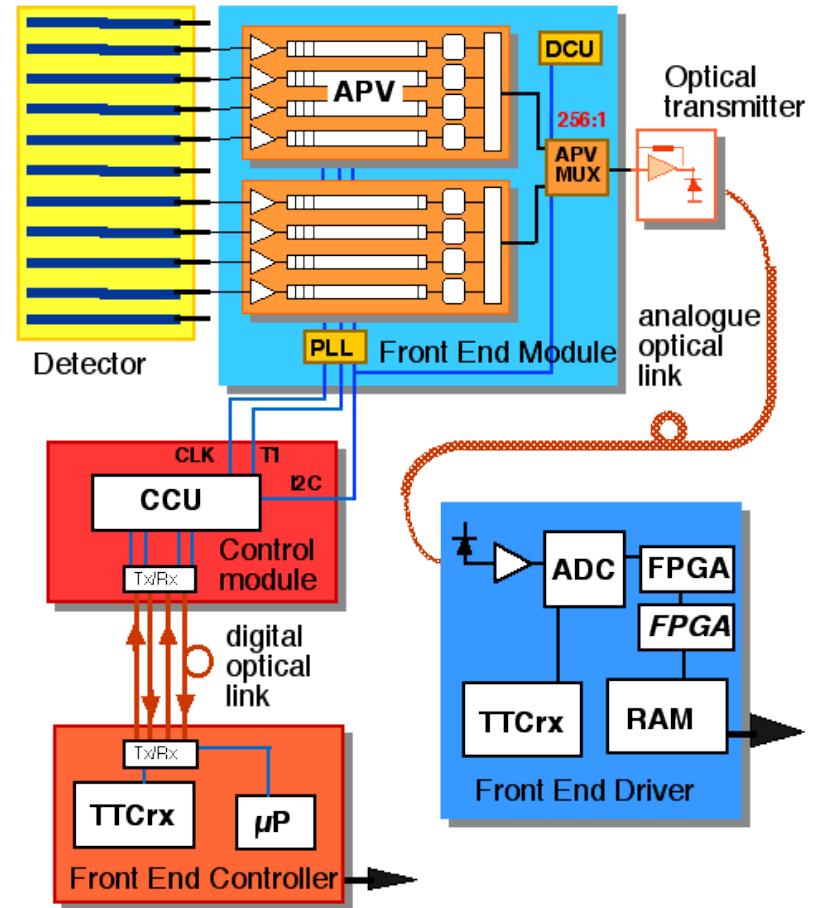


# The APV25 Chip & The STT

- CMS Tracker Readout by APV25
  - Preamp→Shaper →Pipe →Mux
  - $0.25\mu\text{m}$  ⇒ Rad hard to 20 Mrad
  - 128 chan's x 192 cell pipe
  - deadtimeless mode (<32 L1acc)
  - Mux speed 20 or 40 MHz

## • The Basic Readout Chain

- Hybrid {
1. 2 APV (preamp, shape, pipe)
    - \* run at 20 MHz each
  2. 1 APVMux
    - \* 40 MHz output
  3. 1 Fiber (256 channels)
    - \* small size Tx, Rx needed
  4. 1 FED Channel (96 chan/FED)
    - \* digitize, subtr ped, **reorder**, cluster, sparsify
    - \* link to DAQ
  5. FEC/CCU (controller)



**Warning: I am not an APV expert  
watch for errors!**

# DØ Implementation & STT Issues

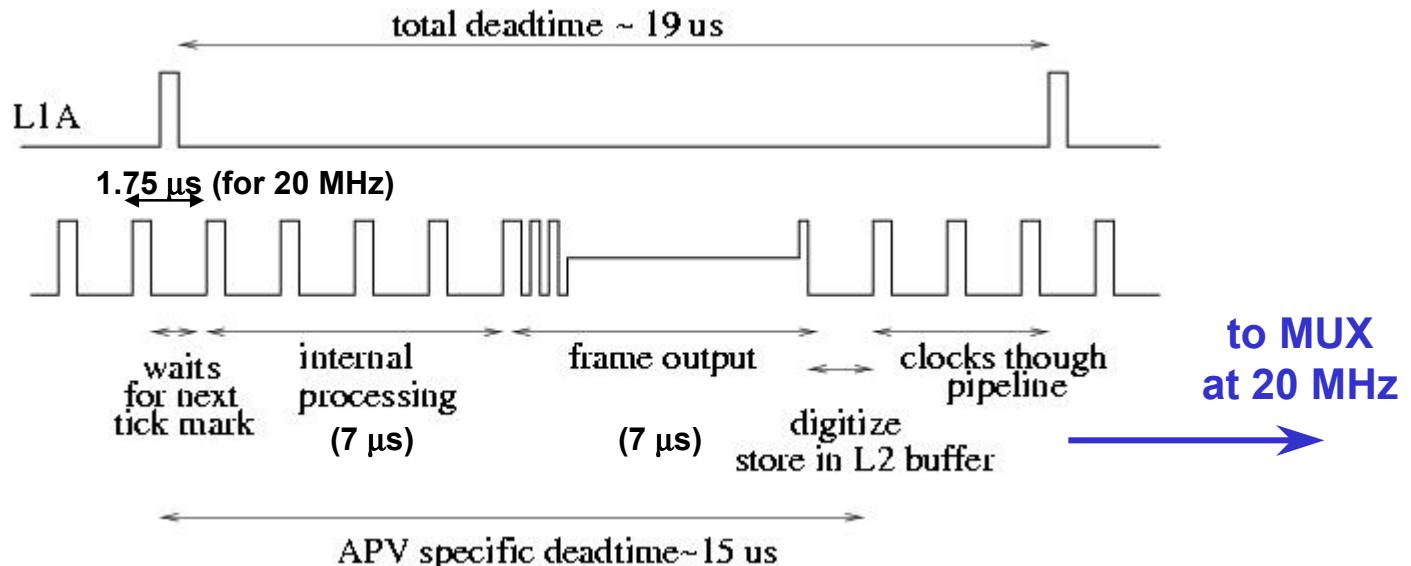
## DØ Modifications to System

- Use unchanged
  - APV & MUX (hybrid?)
  - Optical Xmitter & Fiber
  - CCU
- Remake for DØ
  - APV & optical hybrids ?
  - FED / FEC
    - \* replace VRB / VRBC?
  - Interface to STT
    - \* FEC output ?
  - Interface card(s)
    - \* temp interlocks, etc.
- APV vs SVX4
  - + The chip exists
  - The readout doesn't

## Issues for the STT

- Increased readout time ⇒ longer latency
- APV readout not channel ordered
  - FED reorders / clusters
  - Multi-event buffering of roads on STC & TFC
- SMT input medium changes
  - 4 g-link fibers → VTM may not be optimal
    - \* optical Xmit in units of 12 fibers
    - \* make a new VTM ?

# APV Deadtime



## Possibilities for speedup

- Run APV at 40 MHz (1 APV / MUX)  $\Rightarrow$   **$\sim 8 \mu\text{s}$   
double fiber count**
- Run in deadtimeless mode  $\Rightarrow$   **$\sim 7 \mu\text{s} (?)$   
add buffering at L1**

# Schedule & Cost (my understanding)

APV	<ul style="list-style-type: none"><li>• Chips finalized now</li><li>• Yield (so far) has been around 84%</li></ul>
APV Mux	<ul style="list-style-type: none"><li>• One more iteration ⇒ finalize end of 2000</li></ul>
Optical Tx,Rx	<ul style="list-style-type: none"><li>• Commercial components, but few vendors</li><li>• Choose vendor mid 2001 – then build units</li><li>• Note: can test w/out these</li></ul>
FED	<ul style="list-style-type: none"><li>• Development through 2002 (?)</li><li>• Some help from RAL possible? for DØ FED devel</li></ul>
Cost	<ul style="list-style-type: none"><li>• Total: 2 CHF / channel ⇒ 1 M\$ for DØ<ul style="list-style-type: none"><li>– 28 CHF / APV</li><li>– 9 MCHF for optical (50% Tx, 25% Rx)</li><li>– 7.5 kCHF / FED (96 chan)</li><li>– includes 10% spares + 10% contingency + test</li></ul></li></ul>